CALFED Bay-Delta Program Project Information Form
Watershed Program - Full Proposal Cover Sheet

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Attach to the cover of full proposal. All applicants must fill out this Information Form for their proposal. Failure to answer these questions and include them with the application will result in the application being considered nonresponsive and not considered for funding.

1. Full Proposal Title: ***Murphy Creek Restoration Project***
Concept Proposal Title/Number: ***CALFED Watershed Program/II***
Applicant: ***San Joaquin County Resource Conservation District (SJRCD)***
Applicant Name: ***John B. Meek, Jr. - SJRCD President***
Applicant Mailing Address: ***1440 Arundel Court Lodi, CA 95242***
Applicant Telephone: ***(209)333-8146*** Applicant Fax: ***(209)333-8574*** Applicant Email: ***jmeek@jmeek.com***
Fiscal Agent Name (if different from above): ***John B. Meek, Jr. - SJRCD President (Same as above)***
Fiscal Agent Mailing Address: ***Same as above***
Fiscal Agent Telephone: ***see above*** Fiscal Agent Fax: ***see above*** Fiscal Agent Email: ***see above***

2. Type of Project: Indicate the primary topic for which you are applying (check only one)

_____Assessment	_____Monitoring
_____Capacity Building	_____Outreach
_____Education	_____Planning
X Implementation	_____Research

3. Type of Applicant:

_____Academic Institution/University	_____Non-Profit
_____Federal Agency	_____Private party
_____Joint Venture	_____State Agency
X Local Government ***(Special District)***	_____Tribe or Tribal Government

4. Location (including County): ***Murphy Creek Watershed, eastern San Joaquin County and western Amador County north of Camanche Reservoir***

What major watershed is the project primarily located in:
_____Klamath River (Coast and Cascade Ranges)
_____Sacramento River (Coast, Cascade and Sierra Ranges)
_____San Joaquin River (Coast and Sierra Ranges)
X Bay-Delta (Coast and Sierra Ranges)
_____Southern CA (Coast and Sierra Ranges)
_____Tulare Basin (Coast, Sierra and Tehachapi Ranges)

5. Amount of funding requested: ***$ 282,500***
Cost share/in-kind partners? ***X*** Yes _____No
Identify partners and amount contributed by each:
East Bay Municipal Utility District - $115,000 (in-kind - Labor/Salaries for two biologists and support staff)

6. Have you received funding from CALFED before? ***X*** Yes ____No
If yes, identify project title and source of funds:

Lower Mokelumne River Watershed Stewardship Program (Phase I) - EPA

Continuation of Lower Mokelumne River Watershed Stewardship Program (Phase II/III) - CA Resources Agency

By signing below, the applicant declares the following:

1. The truthfulness of all representations in their proposal
2. The individual signing this form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or an organization)
3. The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the Watershed Program Proposal Solicitation Package and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent provided in the Proposal Solicitation Package (***Compliance with Standard Terms and Conditions***).

John B. Meek, Jr. - SJRCD President
Printed name of applicant

_____
Signature of applicant

1. Project Description

Background: Murphy Creek is a tributary of the Mokelumne River that traverses Amador and San Joaquin Counties entering the Mokelumne River immediately below Camanche Dam in the Eastside Delta Tributaries Area of the CALFED Ecological Management Zone in the Bay-Delta watershed. Land uses within the watershed are predominantly agricultural consisting primarily of cattle grazing and vineyards with limited low-density rural residential uses. The Murphy Creek watershed encompasses approximately 3,100 acres. The main fork of Murphy Creek is approximately 5 miles long. Long-established landowners within the watershed confirm that the creek was historically used by adult salmon which now are only rarely seen in the creek.

Summary: The landowners adjoining Murphy Creek have initiated a watershed stewardship effort to:

- Restore rearing and/or spawning habitat for chinook salmon and steelhead;
- Restore native riparian vegetation to encourage the re-establishment of neotropical migratory birds and other special status wildlife species;
- Improve water quality and improve water flows within the creek; and
- Promote sustainable agricultural practices which continue to support livestock and vineyard production within the watershed.

To achieve these goals, the Murphy Creek landowners enlisted the assistance of the University of California, Davis, and the Natural Resource Conservation Service to establish baseline data and a needs assessment for the Murphy Creek watershed. Pursuant to baseline data collected and the needs assessment, five actions were identified as necessary to achieve the goals of the Murphy Creek landowners to improve wildlife habitat, water quality, water flows, preserve agricultural production and restore ecosystems within the Murphy Creek watershed:

- Remove barriers to fish movements located within three miles of the reach with greater than 1 foot drop;
- Increase canopy cover to encourage cold-water fisheriesBespecially intermediate shrub layers to increase habitat for neotropical migratory birds. Remove non-native plant species (e.g. Himalayan blackberries) and replace with native vegetation;
- Reduce livestock access to riparian zones;
- Repair minor erosion/bank instability to reduce creek sedimentation; and
- Promote sustainable agriculture within the watershed through use of best management practices.

Murphy Creek is part of the Lower Mokelumne River Watershed and forms the northernmost boundaries of the watershed. The Murphy Creek landowners have been working in coordination with the Lower Mokelumne River Watershed Stewardship Plan (LMSP) planning effort. That effort, currently supported by a CALFED grant, already has completed numerous elements of the draft watershed stewardship plan and watershed owner=s manual for the Lower Mokelumne River including the education, wildlife and agricultural elements of the Plan. So great has been the community enthusiasm for the project, that some LMSP implementation programs already have begun.[1] Pursuant to the draft LMSP elements, the following LMSP-identified action programs would be implemented by the Murphy Creek Restoration Project:

> (Wildlife Element, Program 1) Promote Improvement of Spawning Habitat for Salmon and Steelhead
> Implement a public outreach program to identify additional landowners willing along the Mokelumne River to provide expanded access to the Mokelumne River for gravel restoration projects (e.g., those being undertaken by EBMUD and CDFG) for improvement of salmon spawning habitat.
>
> (Wildlife Element, Program 4) Promote and Encourage Landowner Participation in Riparian Restoration

[1] The Department of Conservation recently funded the implementation of a residential/public agency watershed stewardship program which will work directly with residential landowners, schools and public agencies to perform self-evaluation and implement action plans aimed at reducing non-point source pollution within the Lower Mokelumne River Watershed.

Projects Support riparian restoration efforts of groups including those of the Woodbridge Irrigation District (WID), through its Lower Mokelumne River Restoration Program and the Natural Resource Conservation Service Plant Materials Center Riparian Restoration Project. Wherever feasible, enlist community volunteers to assist in these programs to gain knowledge and support of and for the watershed program. Consider involving local schools in the efforts to expand educational opportunities.

(Wildlife Element, Program 7 and Agricultural Element, Program 5) Encourage Establishment of a Voluntary Wildlife/Flood Transition Zone Program Encourage, through education and outreach to public and private landowners, the establishment of a residential, urban, integrated pest management and/or agricultural/wildlife-flood transition zone between the existing narrow riparian corridor and adjoining agricultural, residential or urban uses. Formulate plans with these landowners to provide for expanding the riparian zone, where feasible, and undertake the necessary actions to implement the programs. The program shall be voluntary. Plans shall address who will maintain and bear the costs of maintenance, avoid regulatory agency involvement, provide incentives, address mosquito and vector control on a case-by-case basis (especially when used for flood control/runoff areas or the establishment of setback levees) and protect private property rights including protection of neighboring land uses. These interfaces/transition zones shall be used to increase wildlife habitat along the river and/or provide flood control/runoff areas to help ease flood concerns.

(Wildlife Element, Program 9) Expand Self-Evaluation/Self-Assistance Educational Programs (e.g., Farm*A*Syst/Home*A*Syst Model) to Other Land Uses to Improve Water Quality for Wildlife Facilitate the expansion of self-evaluation/self-assistance educational programs (e.g., Farm*A*Syst/Home*A*Syst) throughout the watershed to encourage the implementation of best management practices to improve wildlife habitat and reduce non-point source pollution. In addition to targeting winegrape growers, the effort should, at a minimum, be expanded to include public and private landowners undertaking residential uses, municipal uses, cattle grazing and similar uses within the watershed. In addition, consider the use of this model to assist in the long-term maintenance of existing wildlife resource areas (e.g., address the need to maintain and use existing pathways and provide barriers to bicycles and similar uses which may stray from the pathways and degrade or destroy wildlife habitat resources).

(Agricultural Element, Program 7) Expand Self-Evaluation/Self-Assistance Educational Programs (e.g., Farm*A*Syst/Home*A*Syst Model) to Other Land Uses to Promote Best Management Practices Facilitate the expansion of self-evaluation/self-assistance educational programs (e.g., Farm*A*Syst/Home*A*Syst and the CA Dairy Quality Assurance Program-CDQAP) throughout the watershed to encourage the implementation of best management practices for agricultural operations. Using the *Lodi Winegrower=s Workbook* (Ohmart, Matthiasson, 2000) as a model, expand the program to address rangeland operations, orchard farming, and other agricultural operations. Facilitate the expansion of the CA Dairy Quality Assurance Program, overseen by San Joaquin County=s U.C. Cooperative Extension, to encourage implementation of best management practices on dairies.

In addition, the Murphy Creek Restoration Program would serve as a model for implementation the Mokelumne River Watershed Stewardship Plan providing valuable information specific to the Lower Mokelumne River Watershed to guide efforts throughout the watershed to restore native habitats, restore spawning/rearing habitats for anadromous fisheries, preserve and enhance water quality and improve water flows through a landowner-initiated effort which maintains agricultural productivity and promotes sustainable agricultural practices. Learning from this model will assist implementation of the LMSP by providing early feedback to allow for adaptive management techniques to be incorporated into future implementation measures of the Lower Mokelumne River Watershed Stewardship Plan.

Underlying Assumptions: Historic salmon-spawning habitat can be restored through the removal of barriers (dams), restoration of native riparian habitats, restoration of gravels, and implementation of best management practices for grazing (e.g., fencing, off-watering) to limit livestock access to riparian areas and through implementation of best management practices for vineyards using the Lodi Winegrape Grower=s Workbook.

Expected outcomes: Restoration of historic salmon and steelhead spawning/rearing habitat in Murphy Creek with

an associated increase in populations of neotropical migratory birds and other special status species with the maintenance of sustainable agricultural practices, increased water flows and improved water quality.

Timetable for completion: Two and one-half years. Year 1: Perform Environmental Analysis and Acquire Permits. Year 2: Refine and Implement Action Plans Year 2.5: Commence monitoring. August 2001 to December 2003 with monitoring ongoing.

General Methodology/Process:

1. **Conduct environmental analysis.** Analysis is expected to require a CEQA/NEPA mitigated negative declaration/environmental assessment. Analysis will include, but is not limited to, addressing impacts associated with dam removal (e.g., effects on downstream flows, erosion and sedimentation) and methodology being used to minimize or remove these impacts, evaluation of potential impacts to cultural resources emphasizing avoidance and on-site monitoring during soil disturbing activities; and potential impacts (and anticipated benefits) to biological resources.

2. **Obtain required permits and conduct required consultations**: Grading Permit (County), Clean Water Act Section 401Certification, Clean Water Act Section 404 Permit; CDFG Streambed Alteration Permit (Section 1601/1603), Section 106 Consultation and others, as necessary.

3. **Finalize/refine individual action plans** for landowners in response to environmental analysis (See Section 8).

4. **Implement individual action plans**. See detailed description of Action Plans for restoring the Murphy Creek Ecosystem in Section 8.

5. **Monitoring**: The East Bay Municipal Utility District (EBMUD) has been conducting studies in the Murphy Creek Watershed as part of its Lower Mokelumne River Joint Settlement Agreement since 1990. EBMUD will continue monitoring within the Lower Mokelumne River Watershed. Murphy Creek landowners also will be active participants in monitoring (e.g., grazing, plant survival). Assistance will be sought from the local Citizen-s Monitoring Group coordinated by the Lodi Lake Docents. Monitoring parameters shall include, but are not limited to: quantification of numbers of trees/shrubs surviving, water flow (e.g. level of improvement), water quality (PO_4, NO_3, NH_4, dissolved oxygen, and other parameters), numbers of salmon/steelhead using stream and how species are using stream (e.g. for rearing and/or spawning), photo points, biological surveys (e.g. of neotropical migratory birds), measurements of turbidity and water temperature, grazing timing/duration and similar parameters. See Section 5 for additional detail.

2. Qualifications/Project Readiness (a. Level of institutional structure, ability and experience to administer funds and conduct project, fiscal agent responsible for handling funds)

SAN JOAQUIN COUNTY RESOURCE CONSERVATION DISTRICT

The San Joaquin County Resource Conservation District (SJRCD) will oversee the implementation of the Murphy Creek Restoration Project and shall be the fiscal agent responsible for handling funds. The SJRCD has extensive experience administering and implementing grants as detailed below in item c. The SJRCD is a Special District authorized by the State Legislature. The SJRCD has nine board members living throughout San Joaquin County, including both the President and Vice President who reside within the Lower Mokelumne River Watershed.

SJRCD President John B. Meek, Jr. has farmed and managed farm properties all of his adult life including citrus, cotton and native pasture. He served as a loan officer for Wells Fargo where his duties included the appraisal of land and improvements. He served as the General Manager of the Land Management Division of McCarty Company from 1986 through 2000 before leaving to open his own agricultural land management consulting firm in 2000. John also administers six Reclamation Districts in the Delta Region.

SJRCD Vice President and Watershed Program Manager Bill Beatty has farmed and worked in the agricultural industry for 15 years. Mr. Beatty previously worked for the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) for 21 years as District Conservationist, Area Conservationist and Assistant State Conservationist. Bill holds a B.S. in Agronomy and M.A. in Public Administration. Mr. Beatty retired from the USDA NRCS in 1992 and currently manages farmland in San Joaquin County.

Program Coordinator Amy Augustine is a land use planner and biologist with nearly 14 years of experience in land use planning, consensus building, grant writing and administration, long-range planning and management of natural and cultural resources. Amy has served as the Lower Mokelumne River Watershed Stewardship Plan Watershed Coordinator and as support staff for the RCD since 1998. Amy has conducted hundreds of environmental reviews and holds a B.A. in Biological Sciences, with honors, from CSU Sacramento . She is a member of the American Institute of Certified Planners (AICP).

EAST BAY MUNICIPAL UTILITY DISTRICT

Kent Reeves and **Joe Merz** are staff biologists for the East Bay Municipal Utility District and have been conducting biological monitoring surveys within the Lower Mokelumne River for several years. Kent is a wildlife biologist who is also involved in range management and has a strong established rapport with landowners throughout the Lower Mokelumne River Watershed and within the Murphy Creek Watershed. Joe is a fisheries biologist and has been responsible for tracking populations of salmonids within the Lower Mokelumne River and Murphy Creek.

USDA NATURAL RESOURCE CONSERVATION SERVICE

Dave Simpson is the District Conservationist for the USDA Natural Resource Conservation Service where he has served for more than 25 years. He holds a B.S. from Humboldt State University in Natural Resources Management and has been active in the USDA NRCS=s Wetland Reserve and Wildlife Habitat Incentive Programs.

Tish Espinosa is a Plant Materials Specialist. She holds an M.S. in Agronomy from Cal Poly Pomona and has been with the USDA NRCS for more than 10 years. Operating out of the NRCS Plant Materials Center located along the Lower Mokelumne River, she will provide assistance in selecting appropriate natives, acquiring plant materials and establishing new native plantings within the Murphy Creek Watershed.

John Bishoff is an Agricultural Engineer with a Ph.D. from South Dakota State University. He will provide assistance in evaluating sedimentation associated with dam removal and other engineering support, as necessary.

MURPHY CREEK LANDOWNERS

Bev and Jack Sparrowk have extensive land holdings in the Murphy Creek Watershed near its confluence with the Mokelumne River. They own and operate Sparrowk Livestock and are active in both the California and National Cattleman=s Association. The Sparrowks initiated the Murphy Creek Restoration Program approximately 2 years ago and have been the impetus for encouraging neighboring landowners to join in the effort to restore Murphy Creek. They will continue to coordinate landowner participation.

Tom Azevedo has worked with the Sparrowks for six years. He is the Controller for Sparrowk Livestock with extensive financial and organization expertise and a degree in Accounting. He has been integrally involved in the Murphy Creek restoration project since its inception. He will continue to provide budgeting and financial administration guidance as well as technical expertise. Other landowners participating in the Murphy Creek restoration include: Cordula and Joseph Atkinson, Carol Atkinson, Jean Cline, Melissa and Steve Holmes, Richard Deller, Nancy Biglow. Additional property owners continue to join the program.

b. Technical support available: Technical support will be made available to the Murphy Creek Restoration project through the RCD (environmental review, permitting and grant administration); the USDA Natural Resource Conservation Service (Engineering evaluations for dam removal and sedimentation analysis and riparian restoration techniques); the East Bay Municipal Utility District (Finalizing Action Plans and riparian restoration plans; assisting and facilitating with permit acquisitions; assisting landowners with Action Plan implementation; pre and post-project monitoring; biological surveys); Augustine Land Use Planning (environmental compliance and permitting; grant administration, integration with the LMSP and subcontracting with cultural resources consultant); Contract equipment operators (budgeting through DSW AG, Inc. for refining project costs); and Landowners (monitoring).

c. Previous projects of similar type you/partners have implemented : **SJRCD**: The SJRCD successfully: 1) Completed Phase I of the Lower Mokelumne River Watershed Stewardship Planning effort pursuant to a previous CALFED grant to solicit community input to identify issues and opportunities within the Lower Mokelumne River Watershed; 2) Is currently overseeing preparation of the draft Lower Mokelumne River Watershed Stewardship Plan through a subsequent CALFED Grant for Phase II/III of the watershed program which is proceeding on schedule and on budget; 3) Administered several Environmental Protection Agency and USDA Natural Resources Conservation Service grants aimed at public outreach and education programs emphasizing natural resource management; 4) Is implementing a Department of Conservation Watershed Coordinator Grant to implement public outreach to residents and public agencies for self-evaluation and implementation of action plans to reduce non-point source pollution within the Lower Mokelumne River Watershed; 5) Is implementing a riparian restoration project along the Mokelumne River through a Partnership Grant awarded by the East Bay Municipal Utility District; 6) Is implementing a Central Valley Project Improvement Act (CVPIA) grant and a U.S. EPA/Trust for Public Land grant to acquire up to 936 acres of vernal pool grasslands in eastern San Joaquin County for educational and management purposes.

EBMUD: EBMUD continues implementation of the Lower Mokelumne River Project Water Quality and Resource Management Program-Lower Mokelumne River Joint Settlement Agreement in partnership with the USFWS and CDFG through the Lower Mokelumne River Partnership. The project promotes protection and enhancement of the anadromous fisheries and the Mokelumne River ecosystem; Encouragement of stakeholder participation and cooperation; and Integration of Mokelumne River strategies with the Bay Delta Accord, CVPIA (Central Valley Project Improvement Act) implementation and similar measures.

NRCS: NRCS operates the Plant Materials Center on the Lower Mokelumne River (for riparian restoration) and has extensive experience in both the Wetlands Reserve and Wildlife Habitat Improvement Programs.

3. Budget

Task/Description	Completion Date	Matching Funds	CALFED Funds	Total
Task 1: Administration				
Task 1a: Monthly invoicing, teleconferences with cooperators and landowners; joint	2/04	$2,500.00	$10,000.00	$12,500.00
Task 2: Prepare Environmental Assessments, Documents and Conduct Required Consultations				
Task 2a: Contact Advisory Agencies	3/02	$2,500.00	$27,000.00	$29,500.00
Task 3: Secure Required Permits				
Task 3a: Prepare Permit applications	8/02	$10,000.00	$20,000.00	$30,000.00
Task 4: Finalize Action Plans				
Task 4a: Meet with landowners on site to review action plans and finalize action	9/02	$20,500.00	$9,500.00	$30,000.00
Task 5: Implement Action Plans				
Task 5a: Coordinate with California Conservation Corps, contractors, plant materials	12/03	$57,000.00	$211,000.00	$268,000.00
Task 6: Monitoring				
Task 1a: Monitor parameters established in Section 6 (Monitoring Plan)	Ongoing	$20,000.00	$0.00	$20,000.00
Task 7: Reporting and Presentations				
Task 7a: Quarterly progress reports: Progress reports on project implementation,	1/04	$2,500.00	$5,000.00	$7,500.00
Total		$115,000.00	$282,500.00	$397,500.00

Budget Summary

Labor Rates:

$15/hr. Support Staff
$50/hr. Biologists/Engineers
$65/hr. Project Manager/Engineers

Task	Labor	Hours	Total Labor	Supplies	Travel	Materials	Subcontract	Match	CALFED	Total
Task 1: Administration	15/hr	32	11,250.00	1,000.00	250.00			2,500.00	10,000.00	12,500.00
Task 2: Prepare	15/hr	21	8,500.00	1,000.00			20,000.00	2,500.00	27,000.00	29,500.00
Task 3: Secure	15/hr	100	19,250.00	500.00	250.00		10,000.00	10,000.00	20,000.00	30,000.00
Task 4: Finalize Action	15/hr	75	29,500.00	500.00				20,500.00	9,500.00	30,000.00
Task 5:Implement	15/hr	133	67,000.00	1000.00		50,000.00	150,000.00	57,000.00	211,000.00	268,000.00
Task 6: Monitoring	15/hr	100	19,000.00	750.00	250.00			20,000.00	0.00	20,000.00
Task 7: Reporting and	15/hr	16	7,000.00	250.00	250.00			2,500.00	5,000.00	7,500.00
Totals:	15/hr	477	161,500.00	5,000.00	1,000.00	50,000.00	180,000.00	115,000.00	282,500.00	397,500.00
Benefits/Salary Percentage: 20% (included in labor rates above)										

BUDGET Narrative:

a. Basis for determining costs including comparisons w/other projects, salary comparisons, include environmental compliance and permitting costs

Match:

EBMUD salaries provide the project=s $115,000 match.

Salaries:

Project costs were based on actual salaries for:

SJRCD Watershed Coordinator ($50.00 to $65.00/hr)

EBMUD biologists ($45,000 each for two biologists=$90,000; $50/hr)

EBMUD Support staff ($25,000; $15/hr)

Salaries/Subconsultants

Consultants provided estimates for the following based on past experience with similar projects for the following:

Cultural resource surveys:	Archaeologists Ric Windmiller and Shelly Davis-King of Davis-King & Associates (costs based on familiarity with the area and performing similar projects in San Joaquin and Amador Counties);
Project administration and reporting	Amy Augustine, Augustine Land Use Planning (costs based on actual costs for administration and report for two Calfed Grants on the Lower Mokelumne River);
Preparation of environmental documents and permit acquisition	Amy Augustine, Augustine Land Use Planning (costs based on actual costs of preparing mitigated negative declaration/Environmental Assessments and for application and acquisition of permits);
Construction work: dam removal and fencing	Donald S. Wortley of DSW Ag, Inc. (Removal and re-sloping of two dams $45,000; Removal and reshaping of culvert drainage - $7,500; Reslope and reshape creek area near Holmes property - $75,000)

Materials/Subconsultants

Tom Azevedo, Controller of Sparrowk Livestock, obtained actual costs for:

California Conservation Corps or similar to remove non-native blackberries	Approximately 20 days @ $7,000 per week = $21,000
Replanting native trees	$3 per tree/plant for materials and labor = $ 5,000

Fence installation	4 miles @ $2.00 per foot for materials and labor = $50,000

b. Describe cost/benefits

For an investment of $282,500 in Calfed funding and a $115,000 donation of staff time from the East Bay Municipal Utility District (EBMUD); the SJRCD, EBMUD, Natural Resource Conservation Service and Murphy Creek Landowners will realize the following benefits:

- Restore rearing and/or spawning habitat for chinook salmon and steelhead;
- Restore native riparian vegetation to encourage the re-establishment of neotropical migratory birds and other special status wildlife species;
- Improve water quality and improve water flows within Murphy Creek; and
- Promote sustainable agricultural practices which continue to support the livestock and vineyard production within the watershed.

While these benefits will be realized directly by the landowners, fish and wildlife species in the Murphy Creek Watershed; the Murphy Creek Restoration Program will also serve as a model for implementation of the Mokelumne River Watershed Stewardship Plan providing valuable information specific to the Lower Mokelumne River Watershed to guide efforts throughout the watershed to restore native habitats, restore spawning/rearing habitats for anadromous fisheries, preserve and enhance water quality and improve water flows through a landowner-initiated effort which maintains agricultural productivity and promotes sustainable agricultural practices. Learning from this model will assist implementation of the LMSP by providing early feedback to allow for adaptive management techniques to be incorporated into future implementation measures of the Lower Mokelumne River Watershed Stewardship Plan.

More importantly, the program will provide a model for landowner stewardship emphasizing the union of sustainable agricultural practices and resource conservation which will encourage other agricultural landowners to initiate similar projects within their own watershed.

4. Technical Feasibility

a. Similarity to previously implemented successful projects in this community or elsewhere

Numerous recent projects illustrate the success of voluntary landowner stewardship programs emphasizing watershed restoration in an agricultural landscape while maintaining sustainable agricultural production. A few of these are:

Upper Butte Creek Watershed Project (California)BReduced delay and injury to Butte Creek adult salmon and steelhead and eliminated entrainment of juvenile Butte Creek Salmon and steelhead under controlled flows while maintaining managed wetlands and agricultural operations. The Upper Butte Creek Project also included the removal of several small dams.

Bigalk Creek Watershed Project (Iowa) - Reduced sedimentation and erosion through reducing livestock access to riparian areas.

Upper and Lower Bad River Watersheds (South Dakota)- Improved water quality through land management in watershed with 100% agricultural land uses including 75% rangeland. Planned grazing systems, erosion control, riparian revegetation, range seedings, and alternative stock watering facilities helped landowners achieve their goals.

North Fork of the Ninnescah River Watershed (Kansas)- Successfully worked with agriculture to establish best management practices through management intensive grazing systems within a watershed containing 99% agricultural land uses. Phosphorous reduction was a primary success of the program.

Steamboat Creek Watershed (Nevada) - Successfully promoted watershed restoration on private lands through voluntary efforts which improved Steamboat Creek=s water quality and re-established vegetation and wildlife habitat.

Teanaway River Watershed (Washington)- Restored fish habitat through increasing instream flows, enhancing water supplies, reducing sedimentation, and conserving riparian zones to restore salmon habitat.

Rangeland Water Quality Management Plan (California) - the UC Cooperative Extension (UCCE) and Natural Resource Conservation Service (NRCS) were key players in the development of this plan facilitated by the California Regional Water Quality Control Board. UCCE and NRCS now have lead roles in helping ranchers to support a self-directed approach to implement rangeland best management practices. The program is proving successful in reducing non-point source pollution on California=s rangelands.

Napa Resource Conservation District Watershed Owner=s Manual (California): Has demonstrated the success of voluntary stewardship-based initiation of best management practices to improve watersheds.

b. If new approach or new method with high likelihood of adding new knowledge or techniques or fill identified gaps in knowledge, describe and what monitoring components will substantiate

The Murphy Creek Restoration Project is unique for three reasons:

- It is landowner-initiated;
- It illustrates the power of the public/private partnerships; and
- It is being implemented by parties interested both in sustaining agriculture and restoring natural resources.

That the Murphy Creek Watershed landowners initiated this restoration project is remarkable. Instead of simply observing the health or deterioration of natural resources on their properties, the landowners have taken charge to improve the health of those resources. These landowners are ranchers and farmers concerned with maintaining and improving the economics of their grazing and vineyard businesses. Yet, where others have found conflict, these landowners see opportunity.

Enter the East Bay Municipal Utility District, a quasi-public agency with no regulatory authority over the landowners, but an agency rich in technical expertise in natural resource restoration and conservation and a strong agency-interest in improving and restoring anadromous fisheries which were removed when the agency constructed Comanche Dam.

Both private and public entities with different perspectives are joining forces, funding and labor to realize their goals.

This non-regulatory public/private partnership approach is ideally suited to working with large landowners with strong private property rights ideals and equally strong respect for both sustainable agriculture and restoration and conservation of natural resources. Since the majority of watershed lands in California are on privately-owned lands, much of it in agricultural production, this approach must become a well-established practice if California is to achieve the goals established by CALFED. The Murphy Creek Restoration Project provides a golden opportunity to establish this practice in Central California. Because the landowners involved are well-respected and active in both the California and National Cattleman=s Associations, a successful Murphy Creek Restoration Project will be promoted to other private rangeland owners throughout the state and nation encouraging them to undertake similar projects.

c. How the finished project will be maintained and to what degree additional funding is required to do so. The Murphy Creek Landowners will be directly responsible for maintaining fencing and riparian vegetation on their own lands after initial project implementation. The landowners will also participate in monitoring and reporting on managed grazing practices, the health of riparian vegetation and the diversity of fish and wildlife in Murphy Creek. Landowners will be responsible for replacing fencing and riparian vegetation. No additional funding from CALFED is proposed for the long-term maintenance of the project. In addition, the East Bay Municipal Utility District (EBMUD) currently monitors the Lower Mokelumne River below Camanche Dam. As part of its monitoring efforts, the district has been measuring conditions in the Murphy Creek Watershed since 1990. Past monitoring data has established a baseline for the project. Continued monitoring of the Murphy Creek Watershed by EBMUD biologists will ensure that results of project actions will continue to be evaluated on an ongoing basis per the monitoring parameters established in Section 5. No additional funding from CALFED is proposed for the long-term monitoring of the project by EBMUD.

5. Monitoring (How will monitoring help determine effectiveness of project implementation and assist project proponent and Calfed with adaptive management processes)

a. Performance measures appropriate to stated goals and objectives for the project.

CALFED Goals	Murphy Creek Restoration Goal	Murphy Creek Restoration Action	Measure of Performance
Recovery of at-risk species	Restore rearing and/or spawning	Removing at least two dams and up to three	Measurable increase in water flow
Recovery of at-risk species	Restore native riparian vegetation	Removing non-native blackberries and	80% survival of newly planted native
Rehabilitation of ecosystem	Improve water quality and improve	Removing at least two dams and up to three	Measurable improvement in water flow
Encourage improved land management and livestock grazing practices along stream riparian zones (Programmatic Action 1C)	Promote sustainable agricultural practices which continue to support the livestock and vineyard production within the watershed.	Implement best management practices for grazing timing and duration on at least three ranches Implement the Lodi Winegrower-s Workbook within the Murphy Creek Watershed on at least three vineyards	Maintenance or increase in productivity on ranches and vineyards.

b. How project will coordinate w/ and support other local and regional monitoring efforts The Murphy Creek Restoration will provide a model applying the draft concepts of the Lower Mokelumne River Watershed Stewardship Plan and will provide a model for monitoring, using a public/private partnership, pursuant to that program. In addition, the project will coordinate with and support the monitoring and restoration efforts of the East Bay Municipal Utility District (EBMUD)-s Lower Mokelumne River Project Water Quality and Resource Management Program-Lower Mokelumne River Joint Settlement Agreement. Under the terms of the Agreement, EBMUD, USFWS and CDFG have established a Lower Mokelumne River Partnership with the following objectives: 1) Protection and Enhancement of the anadromous fishery; 2) Protection and improvement of the Mokelumne River ecosystem; 3) Encouragement of stakeholder participation and cooperation; and 4) Integration of Mokelumne River strategies with the Bay Delta Accord, CVPIA (Central Valley Project Improvement Act) implementation and similar measures. An integral part of this program is ongoing monitoring of the Lower Mokelumne River. EBMUD has expanded these objectives to include Murphy Creek monitoring as an integral part of the Lower Mokelumne River Watershed.

c. Description of how citizen monitoring programs to be part of project As previously noted, the Murphy Creek landowners will be directly responsible for maintaining fencing and riparian vegetation on their own lands after initial project implementation. The landowners will also participate in monitoring and reporting on managed grazing practices, the health of riparian vegetation and the diversity of fish and wildlife in Murphy Creek. Landowners will be responsible for replacing fencing and riparian vegetation. No additional funding from CALFED is proposed for the long-term maintenance of the project

In addition, the Lodi Lake Docents are currently training community members, including high school students, to perform water quality testing and monitoring. Through implementation of the Lower Mokelumne River Watershed Stewardship Plan, the SJRCD and EBMUD will work with landowners to provide monitoring assistance through the Lodi Lake Docent-s citizen water quality monitoring program.

d. Monitoring protocols and are they widely accepted as standard? EBMUD will undertake and/or oversee the technical monitoring actions for the project including sampling fish populations, conducting neotropical migratory bird surveys (anticipated to occur in partnership with the SJRCD and the Point Reyes Bird Observatory), water quality sampling (if citizen monitors are unavailable or are unable to conduct sampling), measuring water flows, and other measurements as indicated in the Monitoring Plan. The SJRCD will work with the EBMUD and the community to establish photo points to measure the success of riparian restoration efforts.

EBMUD shall sample fisheries populations through use of protocols detailed by Merz and Workman (June, 1997) in the *Lower Mokelumne River Fish Community Survey, December 15, 1996 through June 30, 1998*, which rely on widely accepted scientific standards. Surveys establish reaches to facilitate data recording. Reaches are further stratified into habitat types. Three replicates of each habitat type in each reach are sampled twice monthly. Sampling is done seasonally with representations from each water year type. Sampling relies on the use of beach seines, boat electro-fishing (for large, deep areas) and backpack electro-fishing (for riffles, predominantly used in Murphy Creek). Survey protocols are based on multiple sources, including: Meador, M.R., T.F., Cuffney and M.E. Gurtz, 1993. *Methods for sampling fish communities as part of the National Water Quality Assessment Program.* U.S. Geological Survey. Raleigh, North Carolina. Open -File Report 93-104.

Neotropical bird surveys rely on the point-count survey protocols described in:

Ralph, C.J., G.R. Geupel, P.Pyle, T.E. Martin and D.F. DeSante. 1993. *Handbook of field methods for monitoring land birds*. General Technical Report PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, USDA:41 pps.

Ralph C.J., J.R. Sauer and S. Droege, technical editors. 1995. *Monitoring bird populations by point count*. General Technical Report PSW-GTR-149. Albany, CA: Pacific Southwest Research Station, Forest Service, USDA: 187 pps.

Verner, J. 1985. *Assessment of counting techniques*. Pages 247-302 in R.F. Johnston, ed. Current Ornithology. Plenum Press, New York. Water sampling shall continue to use scientifically accepted protocols.

e. How, type and manner of data collection and analysis will be useful for informing local decision makers and used for adaptive management Data collected to measure performance standards during monitoring will provide an invaluable guide for the design of similar projects undertaken pursuant to the Lower Mokelumne River Watershed Stewardship Plan. Similarly, the data can be used to indicate the successes and failures of various techniques for reducing non-point source pollution to guide establishment of more effective mechanisms for other projects.

Adaptive management: Data gathered during monitoring to evaluate performance standards will be used to refine management actions and, where necessary, to improve them through adaptive management. The RCD, NRCS and EBMUD will work with landowners to identify and apply adaptive management responses when performance standards established in this monitoring program are not met.

6. Scientific Basis

a. Assessments of watershed conditions already developed
b. Previous assessment to help project goals and objectives or to inform basic assumptions of proposal
c. Description of scientific assumptions used to develop project goals, objectives and proposed actions and degree to which assumptions are widely accepted (by science community and as a whole in the watershed community).

Murphy Creek currently has several reservoirs within its creek channel which bar fish passage and reduce gravel input into the Mokelumne River. The reservoirs (created primarily from earthen dams of approximately 20' in height) provide water for livestock and vineyard operations. Cattle grazing occurs within the riparian zone and has reduced riparian vegetation cover, in particular the intermediate shrub layer, and promoted non-native plant species (e.g., Himalayan blackberries) which reduce wildlife habitat quality. Cattle entry into the stream also reduces water quality.

The Murphy Creek landowners, with the assistance of the University of California, Davis, have conducted an assessment of watershed conditions utilizing the ARiparian Friendly Grazing Project Survey@ in January, 2000. Parameters evaluated in this assessments included, but were not limited to: weather conditions, turbidity, total suspended solids, electrical conductance, nitrogen and nitrates, phosphorous, pH, sodium, potassium, magnesium, calcium, chlorine, sulfur, stream characterization (e.g., subsystem, origin, type, area), size and number of pastures, grazing systems used, pasture uses, fencing, use of riparian areas, upstream watershed land uses, past land disturbances, indicators used to move livestock into/out of riparian areas, livestock distribution, brush management, water development, bank protection, wildlife habitat in uplands, historic management goals, and methods of monitoring (e.g., photo, temperature, sediment, nutrient, habitat, pathogens, wildlife).

In addition, the USDA=s ANRCS Stream Visual Assessment Protocol@ further assessed conditions within the Murphy Creek watershed. Parameters evaluated included, but were not limited to: channel condition, hydrologic alteration, riparian zone, bank stability, water appearance, nutrient enrichment, barriers to fish movement, instream fish cover, pools, insect/invertebrate habitat, cold-water fishery, warm-water fishery, manure presence, salinity, riffle embeddedness, macroinvertebrates observed. The AStandard Checklist@ further evaluated the hydrology of the stream (e.g., flood plain, beaver use, sinuosity, width/depth ratio, upland watershed evaluation), vegetation (e.g., diversity, age-class, species present as indicators of soil moisture, vigor of riparian plants, adequacy of vegetative cover, plant communities); and erosion deposition (e.g., flood plain and channel characteristics, lateral stream movement, vertical stability, water/sediment balance). The AHabitat Assessment Field Data Sheet@ was used to evaluate epifaunal substrate/available cover, pool substrates, pool variability, sediment deposition, channel flow status, channel alteration, channel sinuosity, bank stability, vegetative protection, riparian vegetation zone width, watershed features and possible NPS Pollution sources (e.g., manure, animal loafing areas, erosion sites, creek crossings), riparian buffers, instream features (e.g., surface velocity, width, depth, canopy cover, high water mark, riffles, pools, runs), aquatic vegetation, water quality, sediment/substrate and livestock/pasture placements, and inorganic substrate components.

These surveys were conducted under the supervision of Theresa A. Ward, Post Graduate Researcher with UCD=s Rangeland and Watershed Program. These assessments identified the following measures needed to restore ecosystem functions to Murphy Creek:

- Remove barriers to fish movements located within three miles of the reach with greater than 1 foot drop;

- Increase canopy cover to encourage cold-water fisheriesBespecially intermediate shrub layers to increase habitat for neotropical migratory birds. Remove non-native plant species (e.g. Himalayan blackberries) and replace with native vegetation;

- Reduce livestock access to riparian zones; and

- Repair minor erosion/bank instability to reduce creek sedimentation.

In addition, the East Bay Municipal Utility District also has been monitoring both the Lower Mokelumne River and the Murphy Creek Watershed as part of its ongoing efforts associated with the East Bay Municipal Utility District (EBMUD) Lower Mokelumne River Project Water Quality and Resource Management Program-Lower Mokelumne River Joint Settlement Agreement . EBMUD has been conducting annual seining surveys since February, 1990. In addition, fish sampling surveys within Murphy Creek have identified the following:

? **Above** the Murphy Creek reservoirs, in May, 2000, fish surveys revealed two natives (three-spined stickleback and hitch) and seven non-natives (bluegill, green sunfish, black crappie, and western mosquito fish. Non-natives comprised over 80% of the total fish captured suggesting a heavily impact system supporting mostly exotic fish typically found in reservoirs or warm water systems.

? **Below** the Murphy Creek reservoirs, in May, 2000, two juvenile steelhead were identified in riffle habitat.

? **Below** the Murphy Creek reservoirs, in April, 2001, fish surveys encompassing two pools and two riffles with an estimated 80 feet (650 sq. ft) of creek sampled, did not detect spawning activity, but did identify 49 juvenile Chinook salmon (47-74 mm FL); 14 prickly sculpin, 14 native and 2 non-native cyprinids (minnows). This equates to approximately .61 juvenile chinook salmon per foot of creek below the reservoirs. Water temperatures were 12.3 degrees Celsius with dissolved oxygen raging between 8.65 and 9.21 mG/L (+/- 1 mG/L error).

? Adult salmon were last observed in Murphy Creek in December, 1996.

These findings indicate that the lower section of Murphy Creek (below reservoirs and other obstructions) is used by juvenile salmonids which actively swim up Murphy Creek from the Mokelumne River and use the lower section for rearing during the spring of various water years. The scientific assumption for the project is that the removal of the reservoirs in the lower reaches of Murphy Creek will expand this habitat for salmonids through barrier removal and reduced water temperatures (accomplished both by encouraging flowing water and increasing riparian cover along the Creek with an accompanying reduction of livestock access to the riparian areas). EBMUD scientists have evaluated the impacts of dam removal on water flow and have concluded that removal will not reduce water flow, but will improve water flows through Murphy Creek sufficient to achieve the project goals.

d. How actions are/are not consistent with scientific assumptions and previous assessments in watershed.

As indicated above in item a, previous assessments in the watershed have directly resulted in recommended actions to restore the ecosystem functionality of Murphy Creek based on indicators from scientific surveys and evaluations created by the USDA NRCS and the University of California, DavisBboth widely-accepted for their technical and scientific expertise.

e. Description of baseline knowledge used to support management actions described in proposal or likelihood that management actions will generate more robust baseline knowledge

See above, item a. Ongoing monitoring will ensure the expansion of baseline knowledge refining the precise parameters which trigger success in restoring anadromous fisheries.

7. CALFED Objectives

a. How will the project address multiple CALFED objectives (Section I) in an integrated fashion, with an emphasis on water supply reliability, water quality, ecosystem quality, and levee stability.

The Murphy Creek Restoration will implement four CALFED ERP Goals:

- **Recovery of at-risk species** through restoration of rearing and/or spawning habitat for Chinook salmon and steelhead and restoring habitat for neotropical migratory birds

- **Rehabilitation of ecosystem processes** by restoring inchannel flow, gravel recruitment to the Mokelumne River, and restoration of native riparian vegetation

- **Enhancement of harvestable species** through expansion of habitat for Chinook salmon and steelhead

- **Restoration of functioning habitats** through restoration of a free-flowing stream system and restoration of native riparian habitat to support neotropical birds and other special status species.

In addition, the Murphy Creek Restoration is fully integrated with the following programs which support CALFED goals:

East Bay Municipal Utility District (EBMUD)=s Lower Mokelumne River Project Water Quality and Resource Management Program-Lower Mokelumne River Joint Settlement Agreement. The Lower Mokelumne River Project Water Quality and Resource Management Program is being coordinated by EBMUD pursuant to the Federal Energy Commission=s (FERC) November 27, 1998, Order Approving Settlement Agreement and Amending License Approved June, 1997, offer of settlement (Agreement). Under the terms of the Agreement, EBMUD, USFWS and CDFG have established a Lower Mokelumne River Partnership with the following objectives:

- Protection and Enhancement of the anadromous fishery;
- Protection and improvement of the Mokelumne River ecosystem;
- Encouragement of stakeholder participation and cooperation; and
- Integration of Mokelumne River strategies with the Bay Delta Accord, CVPIA (Central Valley Project Improvement Act) implementation and similar measures.

The Settlement Agreement specifically directs a commitment to ecosystem protection and enhancement which includes, but is not limited to: spawning gravel improvements; riparian restoration; maintaining a database, and other actions to be determined by a steering committee.

The FERC EIS proposed *Mokelumne River Spawning Improvement Project* will implement several recommended actions including: riparian restoration, sediment source control, predator control, and livestock management (e.g., fencing, rotational grazing, or compensating ranchers for not grazing riparian pastures). In conjunction with the program, EBMUD is undertaking surveys of both common and special status wildlife species including neotropical migratory birds, reptiles, mammals, fish and amphibians. Also pursuant to the program, EBMUD, CDFG, and the USFWS have established a Partnership Fund which makes funds available to interested stakeholders.

Central Valley Project Improvement Act/Anadromous Fish Restoration Plan: The Central Valley Project Improvement Act (CVPIA) of 1992 [Section 3405(b)(1)] directed the Secretary of the Interior to develop and implement a program which makes all reasonable efforts to double natural production of anadromous fish in Central Valley rivers and streams by 2002. In response, the U.S. Fish and Wildlife Service prepared a draft plan entitled: Anadromous Fish Restoration Program Plan (AFRP). The plan identifies multiple anadromous fish habitat deficiencies in each

tributary of the Central Valley of California including the Mokelumne River system where degraded aquatic habitat conditions are documented.

The FERC FEIS and AFRP combined with the CVPIA Restoration Fund affords the opportunity to provide funding for habitat improvement actions. The AFRP effort includes a process to collaborate with other agencies, organizations and the public by augmenting and assisting restoration efforts presently conducted or proposed by local watershed groups, CDFG, and others to increase natural production of anadromous fish in the Central Valley.

East Bay Municipal Utility District (EBMUD) and U.S. Army Corps of Engineers (ACE) Mokelumne River Feasibility Study: EBMUD is working with the ACE to evaluate potential ecosystem restoration and non-traditional flood damage reduction methods in the Mokelumne River flood plan from Camanche Dam to the confluence of the San Joaquin River. Wildlife restoration measures include restoring habitats through plantings and other natural revegetation efforts. Measures will be designed in cooperation with landowners and other water users to protect private property rights, water rights and the economic viability of land.

Lodi-Woodbridge Winegrape Commission (LWWC): LWWC has produced the Lodi Winegrower=s Workbook. This self-assessment guide to integrated farming practices includes a habitat component which recognizes the benefits of wildlife habitats in integrated farming practices. These benefits include control of animal pests (e.g., by raptors and other birds of prey), control of insect pests, reducing erosion, providing filters to improve water quality and A...the presence of wildlife and diverse habitats in and around vineyards adds quality to the experience of anyone touring the Lodi region. As the LWWC district matures, wine tourism is bound to become an important aspect of winegrape growing.@

The workbook includes recommendations for farming practices which can assist farmers in realizing the benefits of managed wildlife resources and avoiding practices that could increase threats to farming practices (e.g., increasing the potential for *Armillaria* root rot on grape vines by removing oaks trees). The workbook also provides information on funding sources which can assist in implementation of wildlife-friendly farming practices [e.g., Wildlife Habitat Incentive Program (WHIP) and the Environmental Quality Incentives Program (EQIP) offered through the Natural Resources Conservation Service (NRCS)].

b. How will project help define and illustrate relationships between watershed processes (including human elements), watershed management and primary goals and objectives of CALFED

The Murphy Creek Restoration Project illustrates the relationship between sustainable agricultural production and natural resource conservation within a watershed. The restoration project specifically emphasizes the relationships between cattle grazing and riparian ecosystems and seeks to restore functionality to the riparian ecosystem while maintaining economically viable livestock production. A primary goal of the effort is the restoration of habitat for at-risk species (Chinook salmon, steelhead, neotropical migratory birds), including harvestable species (Chinook salmon, steelhead) through restoration of functioning habitats.

c. Lead Agency for CEQA/NEPA Compliance:

The San Joaquin County Resource Conservation District shall serve as the lead agency for CEQA. The USDA Natural Resources Conservation Service will serve as the lead agency for NEPA compliance. The Murphy Creek Restoration Project is expected to require a joint mitigated negative declaration/environmental assessment. The SJRCD will prepare the joint document in cooperation with the USDA NRCS. Preparation of the environmental document is expected to take up to six months as necessary to accommodate completion of a cultural resources survey of the area of potential effect.

8. Additional Information

Action Plans: Action plans for participating Murphy Creek landowners will follow the format established in
Watershed Restoration: A Guide for Citizen Involvement in California (US Dpt. of Commerce NOAA, pps 5-3 to 5-4). In addition to statements of goals and objectives, Action Plans shall, at a minimum also include: 1) Action elements to be undertaken (e.g., dam removal, non-native plant removal, riparian restoration, installation of fencing along riparian corridor, creation of off-watering sites, managed grazing practices); 2)Identification of technical assistants to participate in action elements (e.g,. NRCS engineers will evaluate sedimentation associated with dam removal and recommend parameters for decreasing or removing sedimentation created with initial dam removal; EBMUD biologists will assist in plant selection and location and planting techniques; Professional Contractors/NRCS/EBMUD/landowners will collaborate for actions requiring soil disturbances; 3) Native American monitors/archaeologists will be present, if required, to monitor identified cultural resource sites; 4) Plant list, landscape plan for size/placement/type of plant, identification of plant source; 5)Review by EMBUD and RCD to ensure compliance with state and federal permits and environmental analysis; 6) Grading plans (as needed, for soil disturbance/dam removal); 7) Construction plans (as needed for dam removal, restructuring creek crossings, installation of off-water sites); 8) Other: linear feet of fencing required and location; final cost estimates, time frame for completing Action Plans, monitoring requirements and other elements as necessary.

Restoration Guidelines: Specific techniques and protocols to be used in riparian restoration, dam removal, managed grazing and other restoration practices include, but are not limited to, the following primary resources

Federal Interagency Stream Restoration Working Group (USDA, USEPA, Tennessee Valley Authority, FEMA, USDOC, US DOD, US HUD, US DOI), October, 1998. **Stream Corridor Restoration: Principles, Processes , and Practices:**

Chapter 3: Disturbances Affecting Stream Corridors - Domestic Livestock Grazing (pps. 3-18 to 3-19)
Chapter 8: Restoration Design - 8H Land Use Scenarios - Design Approaches for Common Effects, Dams (pps. 8-77 to 8-79)
Chapter 8: 8H Land Use Scenarios -Agriculture (pps 8-83 to 8-96, in particular Tables 8.11: Evaluation and Rating of Grazing Strategies, and Table 8.12: Generalized relationships between grazing systems, stream system characteristics, and riparian vegetation response)
Chapter 9: Restoration Implementation, Monitoring, and Management - Cultural Resources (pg. 9-8)
Chapter 9: Restoration Implementation, Monitoring, and Management - Site Clearing, Installation and Construction - earthmoving, contouring, final grading; Installation of Plant Materials (timing, acquisition, transportation and storage, planting principles); Irrigation, Fencing, Inspections, Maintenance, Monitoring (pps. 9-10 to 9-49).
Appendix A: Instream Practices (migration barriers, tree cover); Streambank Treatment (shaping and planting, branch packing, brush mattresses, coconut fiber rolls, etc.); Stream Corridor Measures (Livestock Exclusion or Management); Watershed Management Practices (Best Management Practices: Agriculture) pgs. A-3 to A-30.

Oregon State University Extension Service, July, 1998. **Watershed Stewardship: A Learning Guide**. Provides additional guidance for establishing monitoring parameters. Chapter III-3: Livestock and Forage Management in Western Oregon Riparian Areas (pps. III.3-1 through III.3-16) offers additional guidelines for setting grazing management goals and strategies, provides assistance with plant lists appropriate for riparian zones (to be modified for California) with information on natives, non-natives that are not harmful to riparian areas, non-natives that spread aggressively to be avoided, and guidance for installing fencing and off-watering facilities.

U.S. Department of Commerce National Oceanic and Atmospheric Administration, December, 1995. **Watershed Restoration: A Guide for Citizen Involvement in California.** Provides additional resources for protocols and procedures for riparian restoration and the format for Action Plans.

Yolo County Resource Conservation District, 2001. **Bringing Farm Edges Back to Life! How to Enhance Your Agriculture and Farm Landscape with Proven Conservation Practices for Increasing Wildlife Cover on Your Farm**.

Murphy Creek Statistics: Source: Joe Merz, EBMUD Biologist, April, 2001

Murphy Creek Habitats - Existing

Creek Habitat Type	Length (Ft)	% Habitat
Run	312	1.24
Riffle	3762	14.9
Pool	4374	17.38
Glide	547	2.17
Culvert	147	0.58
Unclassified	16,024	63.67
Total	25,166/a/	100.00

/a/ 4.8 +/- miles

Murphy Creek Habitats - Projected with Restoration of Entire Reach of Murphy Creek

Habitat Type	Length (Ft)	Area (Sq. Ft)	% of Habitat (averaged)
Run	867.81	4,339.04	3.4
Riffle	10,463.76	52,318.78	41.65
Pool	12,165.99	60,829.96	48.4
Glide	1,521.44	7,607.22	6.07
Culvert	147.00		.58
Total	25,166.00	125,095.00/a/	100.00

/a/ 2.9+/- acres